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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KIM, CHONG R	
ART UNIT	**PAPER NUMBER**
2623	10

DATE MAILED: 11/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/473,003	PATEL ET AL.	
	Examiner	Art Unit	
	Charles Kim	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 December 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 10, 2003 has been entered.

Response to Arguments

2. Applicant's arguments filed October 10, 2003 have been fully considered but they are not persuasive.

Applicants argue (pages 8-9) that "Image preprocessing, as described in Huang, is neither selected, nor applied, at the workstations...Huang states, 'the acquisition gateway computer must perform certain image preprocessing functions before images are sent to the PACS controller or workstations'". The Examiner responds by pointing out that although the acquisition gateway computer must perform certain image preprocessing functions, it does not necessarily mean that it performs all the preprocessing functions. For example, Huang explains that the lookup tables (preprocessing functions) "can be easily built in and inserted into the image header and applied at the time of display to enhance different types of tissue" (page 223). Huang explains that the image is displayed on the PACS display workstation, therefore the preprocessing functions are be applied at the PACS display workstation.

Applicants further argue (pages 9-10) that "Huang teaches that the generation of the lookup table is the preprocessing function, but not the application of a fully processed lookup table", and that "the application of the lookup tables is not the preprocessing function". The Examiner responds by pointing out that the lookup tables taught by Huang are the preprocessing functions, and the application of the lookup tables (at the workstation) is the application of the preprocessing functions.

Applicants further argue (page 10) that "the generation of the lookup table, as Huang states, is the preprocessing function, but this generation does not occur at the workstation". The Examiner responds by pointing out that the claim language does not recite that the preprocessing function is generated at the workstation. For example, claim 1 recites "selecting from a PACS database, using the PACS workstation, a first preprocessing function..." in lines 7-9, and "processing the raw image data at the PACS display workstation by applying the first preprocessing function processing..." in lines 10-12. Therefore, claim 1 indicates that the workstation selects and applies the preprocessing function. In this case, Huang explains that the lookup tables (preprocessing functions) are inserted into the image header (section 8.7.1.4) and sent to the PACS database, allowing the workstations to retrieve the images from the database. Note that the PACS database stores a plurality of images, where each image contains corresponding preprocessing functions (in the image header). Therefore, the workstation inherently selects a preprocessing function when it retrieves an image from the PACS database. Furthermore, the workstation applies the lookup table (preprocessing functions) during display, as noted above.

Applicants further argue (page 12) that "Takeo cannot be combined with Huang because both references relate to different 'fields of endeavor'". The Examiner responds by pointing out that this argument has already been addressed on page 4 of the previous advisory action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 8-9, 11, 12, 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by the textbook entitled "PACS Basic Principles and Applications" by Huang ("Huang").

Referring to claim 1, Huang discloses a method of processing raw image data at a PACS display workstation, the method comprising:

a. retrieving from a PACS database, using a PACS workstation, raw image data delivered from an imaging modality, which has not been fully preprocessed according to a predetermined set of preprocessing functions [pages 177-179 and figure 8.14 on page 225. Note that the images from the imaging modality are sent to the PACS acquisition gateway for partial preprocessing (converting the data format to the PACS standard format), see section 7.1.1. The raw (partially preprocessed) images are then sent to the PACS database (controller), which "services archive retrieval requests from workstations" (TABLE 7.1). The Examiner notes that the raw image data is considered as not haven been fully preprocessed according to a

predetermined set of preprocessing functions, since it is only partially preprocessed (as noted above), and is sent to the workstation for further preprocessing, see below]

b. selecting from a PACS database, using the PACS workstation, a first preprocessing function for the raw image data delivered from the imaging modality [section 8.7.1.4 on pages 222-223. Huang teaches that the PACS acquisition gateway generates brightness and contrast parameters to form a lookup table (preprocessing functions) for adjusting the brightness and contrast of the image (section 8.7.1.4). Huang further states that the lookup tables (preprocessing functions) are inserted into the image header (section 8.7.1.4) and sent to the PACS database, allowing the workstations to retrieve the images from the database, as disclosed above. Note that the PACS database stores a plurality of images, where each image contains corresponding preprocessing functions. Therefore, the workstation inherently selects a preprocessing function when it retrieves an image from the PACS database.]

c. processing the raw image data at the PACS display workstation by applying the first preprocessing function to the raw image data to create a resultant image data [last sentence in section 8.7.1.4 on page 223. Huang teaches that the lookup tables (preprocessing functions) are applied at the time of display. Note that the preprocessing functions are applied at the workstation because the workstation displays the image, see section 7.1.3 on pages 179-180].

Referring to claim 8, Huang further discloses the step of applying an image processing function to the resultant image data to create processed resultant image data (section 12.3.1 on page 320).

Referring to claim 9, Huang further discloses displaying the processed resultant image data (section 12.3 on pages 320-327).

Referring to claim 11, see the rejection of at least claim 1 above. Huang further discloses that the PACS workstation comprises a processing circuit, a PACS network interface coupled to the processing circuit, and a software memory coupled to the processing circuit (section 7.1.3 on page 179).

Referring to claim 12, Huang further discloses that the raw image data corresponds to an anatomical (chest) region, and the preprocessing function is selected based on the anatomical region (second and third paragraph in section 8.7.1.4 on page 223).

Referring to claim 19, see the rejection of at least claim 8 above.

Referring to claim 20, see the rejection of at least claim 9 above.

Referring to claim 21, see the rejection of at least claim 11 above. Huang further discloses an image acquisition workstation (section 7.1.1 on page 177), and a PACS network interfaced to the image acquisition workstation (figure 8.1 on page 201).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-4, 6, 13-15, 17, 22, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the textbook entitled "PACS Basic Principles and Applications" by Huang ("Huang") and Takeo et al., U.S. Patent No. 6,231,246 ("Takeo").

Referring to claims 2 and 3, Huang fails to teach that the raw image data is frequency and contrast preprocessed raw image data.

However, frequency and contrast preprocessed raw image data was exceedingly well known in the art. For example, Takeo discloses a frequency and contrast preprocessed raw image data [col. 12, lines 18-34. Note that "preprocessing" an image is interpreted to mean processing an image that will be further processed. Therefore, processing the image under the "first displayed image processing conditions" is interpreted as frequency and contrast preprocessing because the image is processed to yield a desired level of gradation and a desired level of sharpness (lines 18-21), and then further processed under a "second displayed image processing means"].

Huang and Takeo are considered to be in the same field of endeavor, since they are both concerned with performing image processing functions on medical images. Huang suggests improving the display of the image (Huang, page 223, right column). Takeo's method provides images which have good image quality and are easy to view, thereby improving the display of the image (Takeo, col. 2, lines 41-42). Therefore, it would have been obvious to modify the raw image data of Huang so that it is frequency and contrast preprocessed raw image data, as taught by Takeo. The ordinary artisan would have been motivated to combine the teachings in order to improve the display of the image, thereby enhancing the diagnosis process.

Referring to claim 4, see the discussion of claim 1 above. Huang discloses selecting a contrast preprocessing function (parameter).

Referring to claim 6, Huang fails to teach that the contrast preprocessing function is characterized by at least one of a GT, GA, GC, and GS preprocessing parameters.

Takeo teaches contrast preprocessing functions characterized by at least one of a GT, GA, GC, and GS preprocessing parameters (col. 12, lines 18-60 and TABLE 7).

Huang and Takeo are considered to be in the same field of endeavor, since they are both concerned with performing image processing functions on medical images. Huang suggests improving the display of the image (Huang, page 223, right column). Takeo's method provides images which have good image quality and are easy to view, thereby improving the display of the image (Takeo, col. 2, lines 41-42). Therefore, it would have been obvious to modify the contrast preprocessing function of Huang so that it is characterized by at least one of a GT, GA, GC, and GS preprocessing parameters, as taught by Takeo. The ordinary artisan would have been motivated to combine the teachings in order to improve the display of the image, thereby enhancing the diagnosis process.

Referring to claims 13 and 14, see the rejections of at least claims 2 and 3 above.

Referring to claims 15 and 22, see the rejection of at least claim 4 above.

Referring to claims 17 and 23, see the rejection of at least claim 6 above.

5. Claims 5, 7, 16, 18, 24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the textbook entitled "PACS Basic Principles and Applications" by Huang ("Huang") and Takeo et al., U.S. Patent No. 6,231,246 ("Takeo"), further in view of Vuylsteke, U.S. Patent No. 5,644,662 ("Vuylsteke").

Referring to claim 5, Huang and Takeo fail to teach the step of selecting a frequency preprocessing function. However, this feature was exceedingly well known in the art. For example, Vuylsteke teaches the step of applying frequency preprocessing to contrast

preprocessed images (col. 9, lines 35-39 and figure 3A). Note that "preprocessing" an image is interpreted to mean processing an image that will be further processed. In this case, Vuylsteke explains that the image is contrast preprocessed (CONTRAST ENHANCEMENT), and frequency preprocessing (HP EMPHASIS) is applied to the contrast preprocessed images.

Huang, Takeo, and Vuylsteke are all concerned with performing image processing on medical images. Vuylsteke provides a method of obtaining differently processed image versions originating from a single radiographic original image in a fast and computationally inexpensive way (Vuylsteke, col. 2, lines 21-24). Therefore, it would have been obvious to include the teachings of Vuylsteke in the method of Huang and Takeo, in order to enhance the ergonomics of the system.

Referring to claim 7, Takeo further discloses that the frequency preprocessing functions are characterized by at least one of a RN, RE, and RT preprocessing parameters (col. 12, lines 18-60 and TABLE 7).

Referring to claims 16 and 24, see the rejection of at least claim 5 above.

Referring to claims 18 and 25, see the rejection of at least claim 7 above.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the textbook entitled "PACS Basic Principles and Applications" by Huang ("Huang") and Wofford, U.S. Patent No. 5,542,00 ("Wofford")

Referring to claim 10, Huang fails to explicitly disclose that the resultant image data created by the workstation is stored in the PACS database for future retrieval. However, the Examiner notes that storing image data created by workstations in databases was exceedingly

well known in the art. For example, Wofford teaches a PACS system (col. 2, lines 12-23), wherein the image data created by the workstation (PDS) is stored by the database (col. 6, lines 16-20). Wofford explains that the image is processed at the workstation, and the resultant image is stored in the database for future retrieval (col. 5, lines 45-49 and col. 6, lines 16-20).

Huang and Wofford and both concerned with PACS systems. Huang teaches updating the database (Huang, Table 7.1). Huang further states that the database archives the images (studies) (Huang, Table 7.1). Therefore, it would have been obvious to store the resultant image data in the PACS database in order to keep the database updated, and allow other workstations access to the archived image data for diagnostic purposes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck
November 11, 2003

Jon Chang
Primary Examiner